New Jersey Department of Environmental Protection Submittal Standards for Surveyed Map Data

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Prepared by:

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And the
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Introduction

For many years the New Jersey Department of Environmental Protection has required the submission of surveys and associated data for specific program related project reviews. New Jersey statutes and regulations governing the requirements of surveys and surveyors carrying out this work have been in place for some time, and NJDEP now seeks to formally develop a set of minimum survey standards that adhere to these existing statutes and regulations, presenting those standards in a document that can be easily referenced. The desired result of this will be that all surveys performed for NJDEP programs will meet the same minimum standards although the various programs may have additional needs to be met by further separate program-specific requirements. By identifying these core minimum survey standards through the development of this document, NJDEP is merely recognizing survey requirements already present in the existing statutes and regulations. These standards apply to all surveys performed for NJDEP, and the mapping and digital data derived and submitted to NJDEP from those surveys.

These standards for submittal of cadastral survey data in support of approval and permit applications submitted to the Department are intended to standardize data from external sources so that the information can be more easily accessed, reviewed, stored and acted upon. Accurate and consistent identification of the location of an existing or proposed facility or activity will help increase the Department's ability to respond to the regulated community and the general public more quickly and efficiently.

When identifying a location, whether for reporting purposes or applying for a regulated activity, the boundary delineations of municipal tax parcels can be considered a common standard. Regardless of the reason for the submittal of spatial data to the Department, the highest standard shall be maintained for survey data accuracy. The specifications in this section pertain to any topographic or boundary information required or depicted in the process of completing any type of survey work requested. All surveys submitted to the Department shall be conducted as required under N.J.A.C. 13:40-1.1 *et seq*., unless specifically stated below, or in accordance with the specific requirements of the regulatory program within the Department receiving the survey.

Specific Requirements

1. For all cadastral surveys submitted to NJDEP, the basis of bearings or north reference and the beginning point coordinate values (stated in US Survey Feet to two decimal places) shall be New Jersey State Plane Coordinate System, North American Datum 1983 Adjustment (NJSPCS NAD83). The Grid Factor shall be applied to the Northing and Easting values in US Survey Feet of the parcel's description point of beginning, but not to horizontal survey distances in US Survey Feet. The Grid Factor applied to the Northing and Easting values shall be noted on the survey. The north arrow shown on the plan must indicate the Bearing Base or reference north.
2. All property lines of the surveyed parcel must form closed polygons: All sides must be defined by mathematical survey expressions with angular units being degrees, minutes, and whole seconds of arc. Horizontal distances, vertical elevations, radii of curves, lengths of arc, and New Jersey State Plane Coordinate values of Northing and Easting shall be stated in horizontal ground US Survey feet stated to two decimal places.
3. A separate plan of survey of property shall be prepared for each tax lot or group of contiguous tax lots in common ownership. Lots that are in common ownership in the general vicinity but are not contiguous may be grouped onto a single plan only if detail and clarity of information is not compromised when the scale of the plan is reduced.
4. When a property description is required, a metes and bounds deed description of the property surveyed shall be prepared for each lot and all descriptions shall have a common basis of bearing and point of beginning. Groups of contiguous tax lots in common ownership may be combined into a single description at the discretion of the owner and requesting agency. The description shall be a separate document apart from the plan of survey and shall be prepared on company letterhead that includes the survey contract vendor's name and certificate of authorization number (if applicable), street and mailing addresses, telephone and fax numbers, company email address, and company web page (if any), and shall be signed, sealed and dated by the surveyor responsible for the preparation of the survey.

The Department generally requires that all submitted surveys (digital or on paper), and the surveyors who perform them, follow the standards for performance and documentation established at N.J.S.A. 13:40-1.1 *et seq.*, the governing regulations set by the State Board of Professional Engineers and Land Surveyors. These standards apply to any boundary information required or depicted in the process of completing any type of survey work requested.

Services That May Only Be Performed By A New Jersey Professional Land Surveyor

As described by both New Jersey statute and regulations, there are services that may only be performed by a New Jersey professional land surveyor for inclusion on a cadastral survey *(outline and references courtesy of the New Jersey Society of Professional Land Surveyors)*:

1. Any map or plan that shows:
    a. Property lines (N.J.S.A. 45:8(e), N.J.A.C. 13:40-1.3 and N.J.A.C. 13:40-5.1)
    b. Locations of existing buildings and/or physical features and/or improvements (N.J.S.A. 45:8-28(e))
    c. Locations of existing utilities (N.J.S.A. 45:8-28(e), N.J.A.C. 13:40-1.3 and N.J.A.C. 13:40-5.1(g)4)
    d. Locations of easements (N.J.A.C. 13:40-5.1(a) and N.J.A.C. 13:40-5.1(f)9)
    e. Existing elevations, contours or topography (N.J.S.A. 45:8-28(e) and N.J.A.C. 13:40-5.1(a)(n))
    f. Hydrographic or bathymetric information (N.J.S.A. 45:28(e))
    g. Post-construction conditions – horizontal and vertical (N.J.A.C. 13:40-7.2(a))
    h. Wetlands delineation by metes and bounds or coordinate location (N.J.A.C. 13:40-7.2(a))
2. FEMA Elevation Certificates (N.J.S.A. 45:8-28(e) and N.J.A.C. 13:40-1.3)
3. Major and minor subdivision plans (N.J.S.A. 46:26B-1, N.J.A.C. 13:40-1.3, N.J.A.C. 13:40-5.1(m) and N.J.A.C. 13:40-7.4)
4. Determination of areas and volumes included as part of a land survey (N.J.S.A. 45:8(e) and N.J.A.C. 13:40-1.3)
5. Preparation and annual maintenance of tax maps (N.J.S.A. 19:23A-1.7 and N.J.A.C. 13:40-5.1(k))
6. Preparation and maintenance of base mapping for Land Information Systems (N.J.S.A. 45:8-28(e) and N.J.A.C. 13:40-1.3)
7. Foundation location surveys (N.J.A.C. 5:23-2.18(b)1.ii(1) and N.J.A.C. 13:40-72(a))

Survey information may be transferred to another plan that is submitted to the Department if the following information is provided:

1. The surveyor who prepared the survey
2. The date of the survey
3. Who the survey was prepared for, and
4. A signed and sealed copy of the Survey attached to the submitted plan. (N.J.A.C. 13:40-7.2(a)1 and N.J.A.C. 13:40-5.1(n))

Property Surveys - Minimum Standard Detail Requirements for Relative Positional Precision

Additionally, all property surveys submitted to the Department shall meet the latest Minimum Standard Detail Requirements for relative positional precision as described by the American Land Title Association/American Congress on Surveying and Mapping (ALTA/ACSM). The measurement standards are found in Section 3, paragraph E of that document, and are reproduced here:

Measurement Standards - The following measurement standards address Relative Positional Precision for the monuments or witnesses marking the corners of the surveyed property.

i. "Relative Positional Precision" means the length of the semi-major axis, expressed in feet or meters, of the error ellipse representing the uncertainty due to random errors in measurements in the location of the monument, or witness, marking any corner of the surveyed property relative to the monument, or witness, marking any other corner of the surveyed property at the 95 percent confidence level (two standard deviations). Relative Positional Precision is estimated by the results of a correctly weighted least squares adjustment of the survey.

ii. Any boundary lines and corners established or retraced may have uncertainties in location resulting from (1) the availability, condition, history and integrity of reference or controlling monuments, (2) ambiguities in the record descriptions or plats of the surveyed property or its adjoiners, (3) occupation or possession lines as they may differ from the written title lines, and (4) Relative Positional Precision. Of these four sources of uncertainty, only Relative Positional Precision is controllable, although due to the inherent errors in any measurement, it cannot be eliminated. The magnitude of the first three uncertainties can be projected based on evidence; Relative Positional Precision is estimated using statistical means (see **i.** above and **v.** below).

iii. The first three of these sources of uncertainty must be weighed as part of the evidence in the determination of where, in the surveyor's opinion, the boundary lines and corners of the surveyed property should be located (see Section 3.D. above). Relative Positional Precision is a measure of how precisely the surveyor is able to monument and report those positions; it is not a substitute for the application of proper boundary law principles. A boundary corner or line may have a small Relative Positional Precision because the survey measurements were precise, yet still be in the wrong position (i.e. inaccurate) if it was established or retraced using faulty or improper application of boundary law principles.

iv. For any measurement technology or procedure used on an ALTA/ACSM Land Title Survey, the surveyor shall (1) use appropriately trained personnel, (2) compensate for systematic errors, including those associated with instrument calibration, and (3) use appropriate error propagation and measurement design theory (selecting the proper instruments, geometric layouts, and field and computational procedures) to control random errors such that the maximum allowable Relative Positional Precision outlined in **v.** below is not exceeded.

v. The maximum allowable Relative Positional Precision for an ALTA/ACSM Land Title Survey is 2 cm (0.07 feet) plus 50 parts per million (based on the direct distance between the two corners being tested). It is recognized that in certain circumstances, the size or

configuration of the surveyed property, or the relief, vegetation or improvements on the surveyed property will result in survey measurements for which the maximum allowable Relative Positional Precision may be exceeded. If the maximum allowable Relative Positional Precision is exceeded, the surveyor shall note the reason as explained in Section 6.B.ix of the ALTA/ACSM Minimum Standard Detail Requirements.

Disclaimer

This policy is intended to provide guidance to the regulated community and industry professionals to ensure the submittal of accurate information to the New Jersey Department of Environmental Protection to advance its mission. This data submittal requirement will reduce the time and cost for compliance monitoring, permit application processing and land use map updates while taking advantage of new technology, reducing the cost of digital conversion, help in maintaining a higher standard of map data and facilitate the effective transfer of this information from the regulated community to the Department. Nothing in this policy guarantees or determines proposed or established property lines within the State based on information submitted to, or any permits or authorizations issued by, the Department. Additionally, nothing in this policy guarantees approval of materials submitted to any program within NJDEP.

Information Sources:

The State Board of Professional Engineers and Land Surveyors:

http://www.njconsumeraffairs.gov/pels/

Standards of Performance:

http://www.njconsumeraffairs.gov/regulations/Chapter-40-State-Board-of-Professional-Engineers-and-Land-Surveyors.pdf

Statues and Regulations governing Engineers and Land Surveyors:

http://www.njconsumeraffairs.gov/pels/Pages/regulations.aspx

American Land Title Association/American Congress on Surveying and Mapping (ALTA/ACSM):

www.acsm.net and www.alta.org

ALTA/ACSM Minimum Standard Detail Requirements:

http://www.acsm.net/_data/global/images/PDF%20Documents/ACSM/20110223ALTAACSMLandTitleSurveyStandard2011.pdf

New Jersey Society of Professional Land Surveyors:

www.njspls.org